1969 AB3/BC3

$f(x)=\frac{1}{x}+\ln x$

closed interval $\frac{1}{e}\le x\le e$

i) abs. max

ii) abs. min

$[f'(x)]$

1^{st} and 2^{nd} derivative

$f(e)$

$f(\frac{1}{e})$

--- - + + +

$\frac{1}{e}$ $\frac{1}{2}$ 1 2 e

$$f'(x)=-\frac{1}{x^2}+\frac{1}{x}$$

$$-\frac{1}{x^2}+\frac{1}{x}\cdot\frac{(x)}{(x)}=0$$

$$-\frac{1}{x^2}+\frac{x}{x^2}=\frac{-1+x}{x^2}=0$$

$-1+x=0$ $x=1$

$\frac{1}{x}+\ln x$

$$-\frac{1}{(\frac{1}{2})^2}+\frac{1}{\frac{1}{2}}$$

$-4+2=-2$

$$-\frac{1}{(2)^2}+\frac{1}{2}$$

$$-\frac{1}{4}+\frac{1}{2}=\frac{1}{4}$$

$$\frac{1}{\frac{1}{e}}+\ln\frac{1}{e}=\text{abs max}$$

$2.7-1.7$

$$\frac{1}{e}+\ln e$$

$\frac{1}{e}$ $.3+1$ 1.3

b) $f'(x) = \frac{-1+x}{x^2}$

$f''(x) = \frac{1(x^2) - ((-1+x)(2x))}{(x^2)^2} = 0$

$\frac{x^2 - (-2x+2x^2)}{x^4} = 0$

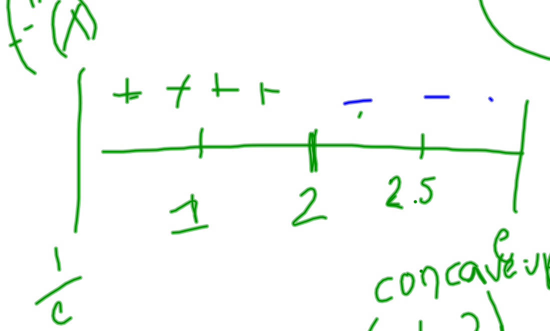
$\frac{x^2+2x-2x^2}{x^4} \Rightarrow -x^2+2x=0$

$x(-x+2)=0$

$\rightarrow -x+2=0$

$x=2$

$x=0$ $\varnothing$



concave up

$\left(\frac{1}{e}, 2\right)$

$-(1)^2+2(1)=+1$

$-(2.5)^2+2(2.5)= -$

$\cancel{6.25}$

$2.5(-2.5+2) = -$

AP exam

M/C

28 q, 55 min
no calc

17 q, 50 min
calc

45 q × 1.2 = 54 points

then
Free Response Questions

2 q, 30 minutes

4 q, 60 min

6 q, 9 points each
= 54 points

Jan 22-7:51 AM

archive.org/details/ap_calculus_ab
-bc

Jan 22-7:51 AM

$f(x) = \frac{1}{x} + \ln x$

a) $f(1) = 1$ abs min 1

$e \approx 2.718$

$\frac{1}{e} \approx \frac{1}{3}$

1 $f\left(\frac{1}{e}\right) = e - 1 \approx 1.7$ abs max 1

$f(e) = \frac{1}{e} + 1 \approx 1.4$

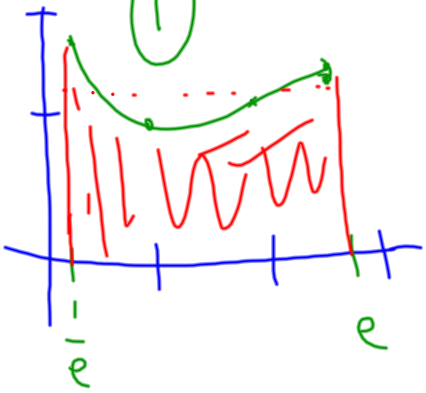
1 a) $f'(x) = \frac{-1}{x^2} + \frac{1}{x} = \frac{x-1}{x^2}$

1 $= 0$ and get $x = 1$

b) $f''(x) = \frac{2-x}{x^3}$ 1

c-up $\left(\frac{1}{e}, 2\right)$ 1

c) 1



d) Avg value = 1

$$\frac{1}{e - \frac{1}{e}} \int_{\frac{1}{e}}^{e} \frac{1}{x} + \ln x \, dx$$

1970 AB1/BC1

x^2-2x+3 $(2,3)$

$f'(x)=2x-2$

$2(2)-2=$

$f'(2)=4-2=2$

$3=\frac{-1x}{2}+b$

$m=\frac{-1}{2}$ $\frac{-1(2)}{2}+b$

$3=-1$
$+1$ $+1$

$y=mx+b$

$b=4$

$y=\frac{-x}{2}+4$

$(y-3)=\frac{-1}{2}(x-2)$

$$\int_0^2 \left(-\frac{x}{2}+4\right)-\left(x^2-2x+3\right)dx$$

$$= \int_0^2 -x^2+\frac{3}{2}x+1\,dx$$

$y=-\frac{x}{2}+4$

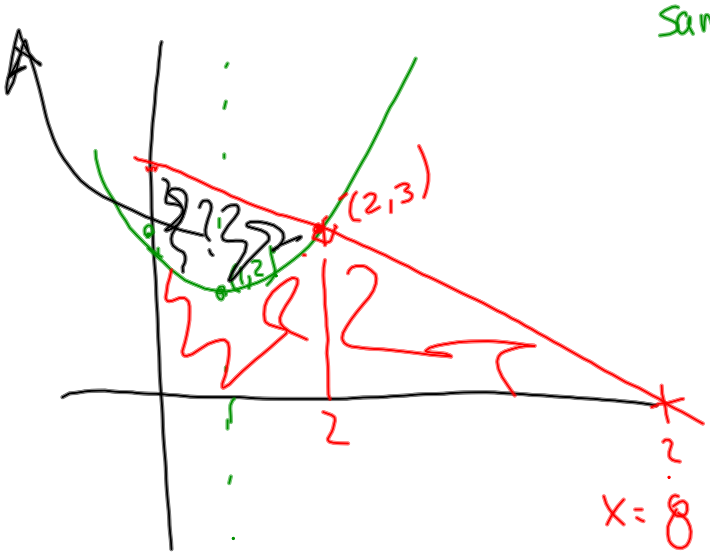
x^2-2x+3

same line of symmetry as

$x^2-2x = x(x-2)$

line of symmetry

$\frac{0+2}{2}=1=x$



$y=-\frac{x}{2}+4=0$ find x-intercept

$\frac{x}{2}=4 \ldots x=8$

$A_\Delta = \frac{1}{2}bh = \frac{1}{2}(8-2)(3) = 9$

$$A_{\boxed{u}} = \int_0^2 x^2-2x+3\,dx = \left(\frac{x^3}{3}-x^2+3x\right)\Big|_0^2 = \left(\frac{8}{3}-4+6\right)-(0-0+0) = \frac{14}{3}$$

$A = \frac{41}{3}$